## INDUS UNIVERSITY

**INDUS UNIVERSITY**
**IITE//IMS/ISHLS/IICT**
**Constituent Institutes of Indus University**

XCE0418/01

| Semester: | IV | Branch: | CE/CS/IT |
|---|---|---|---|
| **END SEMESTER EXAMINATION** | | | |
| **Subject Code:** | CE0418 | **Subject Name:** | Operating Systems |
| **Date:** | 16/5/2022 | **Time:** | 10:00am To 11:30am |
| **Day:** | Monday | **Total Marks:** | 40 |

Instructions:

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

| | | |
|---|---|---|
| Q.1 | Define Operating System and Discuss role of Operating System as a resource manager. | 04 |
| Q.2 | Discuss Process States and its Transition with Diagram. | 06 |

**OR**

| | | |
|---|---|---|
| | Analyse Peterson's solution for mutual exclusion problem. What is the limitation of this approach? Give the solution to overcome. | 06 |

| | | |
|---|---|---|
| Q.3 | Define (i) Critical Section (ii) Mutual Exclusion (iii) Bounded Waiting (iv) Race Condition. | 04 |

Q.4

| Process | Max | Allocation | Available |
|---|---|---|---|
| P0 | 6 0 1 2 | 4 0 0 1 | 3 2 1 1 |
| P1 | 2 7 5 0 | 1 1 0 0 | |
| P2 | 2 3 5 6 | 1 2 5 4 | |
| P3 | 1 6 5 3 | 0 6 3 3 | |
| P4 | 1 6 5 6 | 0 2 1 2 | |

06

Using Banker's algorithm, answer the following questions:-
I. How many resources of type A, B, C, D are there?
II. What are the contents of need matrix?
III. Find if the system is in safe state? If it is, find the safe sequence.

**OR**

Suppose that a disk drive has 5000 cylinders, numbered 0 to 4999. The drive is currently serving a request at cylinder 143, and the previous Request was at cylinder 125.
The queue of pending requests, in FIFO order, is

    86, 1470, 913, 1774, 948, 1509, 1022, 1750, 130

06

Starting from the current head position, what is the total distance (in cylinders) that the disk arm moves to satisfy all the pending requests, for each of the following disk scheduling (1) FCFS (2) SCAN (3) CSCAN

**Q.5**   Differentiate Segmentation and Paging.                                    04

**Q.6**   Given memory partition of 100K, 500K, 200K, 300K, and 600K in order,      06
How would each of the First-fit, Best-fit and Worst-fit algonthms place the
processes of 212K, 417K, 112K and 426K in order?
Which algorithm makes the most efficient use of memory? Show the
diagram of memory status in each case.

**OR**

What is "i-node"? Explain File and Directory Management of Unix                     06
operating system and discuss back – up methods for Reliability.

**Q.7**   Discuss Protection Policy and mechanisms.                                 04

**Q.8**   Discuss Record Blocking in file systems.                                  06

**OR**

Consider the set of 6 processes whose arrival time and burst time are              06
given below:

| Process ID | Arrival Time | Burst Time |
|------------|--------------|------------|
| P1         | 0            | 4          |
| P2         | 1            | 5          |
| P3         | 2            | 2          |
| P4         | 3            | 1          |
| P5         | 4            | 6          |
| P6         | 6            | 3          |

If the CPU scheduling policy is Round Robin with time quantum = 2,
calculate the average waiting time and average turn around time.